NATURAL RESOURCES AGENCY

EDMUND G. BROWN JR., GOVERNOR

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

DIVISION OF OIL, GAS, & GEOTHERMAL RESOURCES

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May 30, 2013

Steve Rusch
Plains Exploration & Production Company
5640 South Fairfax Avenue
Los Angeles, CA 90056

Dear Mr. Rusch:

The Department of Conservation's Division of Oil, Gas, and Geothermal Resources (Division) and California Geologic Survey (CGS) representatives recently met with you and your team to discuss the conclusions reported in the 2012 Ground Movement Survey required by Los Angeles' Community Standards District (CSD). The report identified a subsidence bowl to exceed the present parameters for the CSD. Although the report did not identify the cause of the subsidence bowl, the report indicated that it did not appear to be associated to the oil and gas operations since the production and injection volumes appeared to be balanced in the area surrounding the subsidence bowl. The report reads:

> "*The reason for the differences in 2012 survey results does not stand out. During both calendar years 2010 and 2011 (preceding the surveys in early 2011 and early 2012), the waterflood injection volume was slightly larger than the Vickers/Rindge total liquids production volume. The monument elevation/location changes do not correlate with the local waterflood volume balance. No changes in production or waterflood practices have been identified that can explain the behavior. As yearly Inglewood survey program continues, it may become clearer if the 2012 results are an expression of volatility associated with various factors affecting the local topography, or if they are a trend associated with tectonic strain and/or other factors in the Baldwin Hills Inglewood oilfield area.*"

The Division is satisfied with the survey methodology of the data indicating the relative ground movement in the Inglewood field. However, both the Division and CGS have some concerns regarding the hypothesis that the subsidence bowl is significantly associated with tectonic fault creep. The displacement vectors derived from the 2012 survey data are consistent with localized subsidence, but are not consistent with slip expected along the Newport-Inglewood Fault Zone.

Also, displacement due to tectonic fault creep has been reported elsewhere along the fault zone and the area within and adjacent to the Baldwin Hills is not characterized by micro seismicity typically associated with actively creeping faults in California.

Although Plains Exploration & Production Company (PXP) identified that the injection and production volumes were balanced near the subsidence bowl, this statement was based on balanced injection and production via a map view and apparently not based on a balanced injection/production within separate fault blocks or vertical evaluation by productive horizons. PXP has not quantified if the injection and production volumes were balanced in the separate productive/injection zones, or if the different fault blocks were isolated by sealing faults. In order for PXP to determine that the injection/production is balanced, additional analysis would be required to determine the ratio of production and injection in the different producing horizons.

Under the "General Observation and Conclusions", the report states:

> *"Historically, the Vickers/Rindge interval has been moderately prone to compaction, due to the large reservoir thickness, and unconsolidated rock fabric (the grains are not well cemented to each other), and relatively high porosity."*

This statement suggested that compaction/subsidence is possible and that a more in depth analysis of the balance injection by producing intervals is required.

Therefore, in order for both PXP and the Division to determine if the subsidence bowl is related to the oil field activity, the Division requests the following information:

1) A detailed geologic map that identifies the different fault blocks surrounding the subsidence bowl

2) Supporting data to quantify whether the identified faults are sealing or non-sealing in the production/injection zones

3) Detailed cross-sections or a 3 dimensional model identifying the individual injection and productive reservoirs in the area of concern, by fault blocks

4) Data supporting the material balance from production verses injection volumes in the different production zones and fault blocks throughout the productive column in the surrounding area of the subsidence bowl

The Division requests that this information be collected and maintained on a regular basis. The Division would like to address this particular issue quickly and

is requesting that this information be submitted to the Cypress district office by June 28, 2013. If you are unable to meet this timeframe, or if you have any questions or concerns, please feel free to contact me at (916) 323-1780.

Sincerely,

Robert S. Habel
Chief Deputy

cc: LA County, Community Standards District